Innovation and technological renewal in a transforming economy

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Abstract
Over the last few decades, global competition has grown considerably, while in this competition, innovation is becoming the main trump card. The transition to a market economy in Central and Eastern Europe, including Hungary, has paved the way for participation in a global innovation competition, and new players in innovation – entrepreneurs – have also appeared. The limits of the decentralized, free initiative are no longer present, and the strong financial motivation of innovators is not limited by the equalizing behavior typical of planned economies. Therefore, the question is why the furtherance of innovation in Hungary has not been promoted by evolving market conditions? What is the reason for this anomaly? Earlier research sought the answer through the analysis of macroeconomic factors such as low levels of R&D expenditure, size and structure of the IT sector, quality of education, etc. The author tries to show that besides the better examined macroeconomic factors, hidden behavioral attitudes are also present behind the innovation-inhibiting phenomena, such as low willingness for taking risk and learning, noncompliance with contracts and rules, and other "soft factors". The weakness of innovation is also closely linked to the fact that the opportunities and incomes of market players depend heavily on the "strength" of their ties to state or government institutions.[3]
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JEL (Journal of Economic Literature) codes: O32, O33, O34, P10, P11, P20, P21

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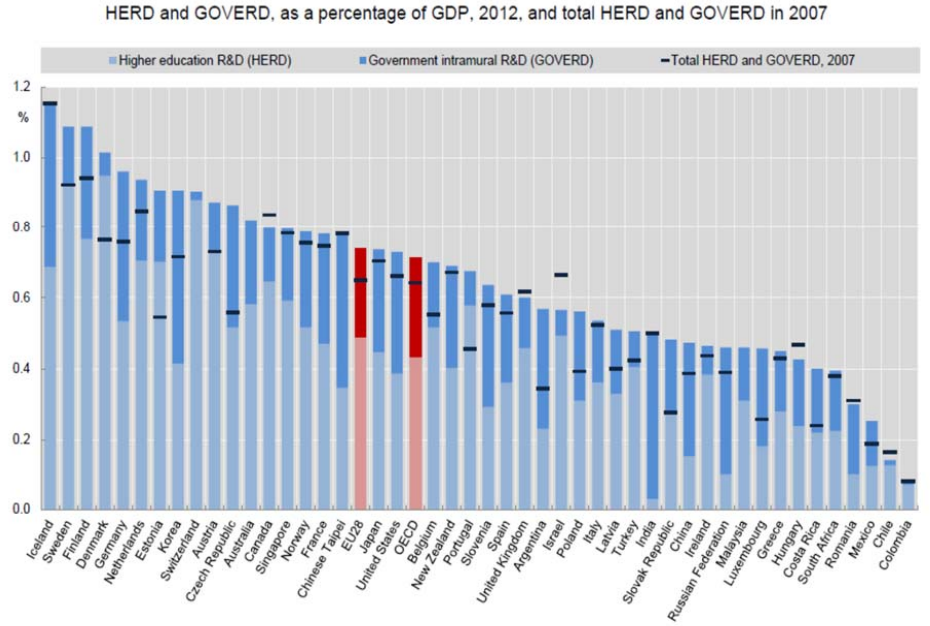
Introduction: Defining the problem

Hungary's innovation potential, considering R&D spending, is problematic comparing it not only to developed countries but to most CEE countries as well. In 2012, only in one EU country, Romania spent the state less as a proportion of GDP for innovation (including higher education). In addition, government spending on R&D (including higher education) decreased to GDP in 2012 compared to 2007, which occurred in few OECD member states. Among them, a larger fall than in Hungary happened only in one OECD country, namely Israel. However, public expenditures spent on R&D are much higher in Israel than in Hungary.[4] Reducing the ratio to GDP on R&D of government expenditure is difficult to justify, even if this improves the share of GERD and BERD[5] indicators and the weight of private expenditures within R&D expenditures – which is otherwise very low for Hungary – grows meaningfully (Figure 1).



Source: OECD Main Science and Technology Indicators Database, June 2014, www.oecd.org/sti/msti; Eurostat and UNESCO Institute of Statistics, June 2014.

4 Particularly critical is the decline in public support for innovation in an era in which the transformation of the technological bases of the economy is driven by innovations and almost every other phenomenon is due to innovation. Nowadays, in a normally functioning modern economy, especially in developed countries, innovation accounts for 60-80 percent of gross domestic product (GDP) growth. Source: OECD Main Science and Technology Indicators Database, June 2014, www.oecd.org/st/mst; Eurostat and the OECD Institute of Statistics, June 2014

5 BERD = R & D expenditures of the business sector, GERD = (Gross Domestic) R & D expenditures, GOVERD = Government R & D expenditures, HERD = R & D expenditures of higher education. BERD, measured at constant prices, has grown strongly by 9% since 2000, while in 2000 it represented 0.36% of GDP, almost doubling to 2010 when it spilled 0.69% of GDP. But the high level of BERD measured in 2010 is largely a high-tech production at foreign subsidiaries; domestic-owned firms only make little innovation. (See OECD Science, Technology and Innovation Outlook 2012, p.304.)

The small contribution of total factor productivity (TFP) to growth in Hungary is attributed to technological progress and, in this context, weaknesses in innovation, which is still very low compared to other Central and Eastern European countries. In addition, this ratio also showed a downward trend and in the period of the global crisis slid straight to the negative range.[6] Regarding competitiveness, the situation for Hungary has not improved considerably in the last fifteen years and even deteriorated in some respects: In 2001, Hungary was ranked 32nd among the countries of the World in competitiveness[7] and 41st in 2006.[8] Since then, Hungary has been sliding downwards: In 2015, it was only 63rd in the World Economic Forum ranking.[9] Again, behind the decline in competitiveness, however, we can only suspect the weakness of innovation. Therefore, even if it is not the only reason for Hungary's dramatic downturn in the ranking of competitiveness, it is definitely a decisive factor in the deterioration in this field.

The share of innovative enterprises in Hungary is the lowest in the European Union, 32%, which is about half of the similar figure in leading EU countries.[10] Moreover, an overwhelming majority of innovative companies are foreign-owned enterprises and innovation activities of SMEs are sporadic if we exclude barefoot or poor innovations that are not included in the EU, OECD or national surveys.

> As a concrete example, it is worth mentioning here that in one of the most dynamic regions of Central Transdanubia, researchers found only 25 companies with more significant innovation capacity (Grosz et al. 2004). Based on the 2012 Regional Innovation Scoreboard, the innovation features of Central Transdanubia are as follows:
> "– public R & D expenditures stagnated between 2009 and 2011, while there is a significant increase in entrepreneurial expenditures,
> – in non-R & D innovation spending over the above period there is a significant reduction in all regions except Southern Transdanubia,
> – the willingness of innovative companies to cooperate is higher than the national average, while the number of registered European patents is below average,
> – finally, due to the economic orientation of the region, in the high-tech sectors and in the knowledge intensive service sector, employment significantly exceeds the Hungarian average."[11]

According to the IUS (Innovation Union Scoreboard) 2015, almost all indicators related to innovation are below the EU average. What are the reasons behind the innovation weaknesses

6 Source: OECD (2013): OECD Economic Outlook: Statistics and Projections, December
7 Source:http://web.mit.edu/15.018/attach/Global%20Competitiveness%20Report%202000,%20part%201.pdf
8 Source: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2006-07.pdf
9 Source:http://reports.weforum.org/global-competitiveness-report-2015-016/economies/#indexId=GCI&economy=HUN
10 Hungarian Central Statistical Office (KSH): How innovative are Hungarian enterprises? http://www.szta.hu/blog/ksh-mennyire-innovativak-a-magyar-vallalkozasok/
11 Ákos Szépvölgyi, György Fekete, Gabriella Baráth: Intelligent Innovation Specialization Strategy of Central Transdanubia. Central Transdanubian Regional Innovation Agency, 2013, p. www.kormanyhivatal.hu/download/5/4a/51000/KDRIS3-1.pdf

of innovation activities? In our short analysis, we try to point out the specific institutional structure that plays a decisive role in the backwardness of the country.

Institutional determinants of innovation

Without a complex analysis of the institutional system in Hungary, we cannot answer the above question and we cannot explain why technological development and innovation did not really accelerate, and economic development – because of the above deficiencies – has not risen from time to time. Of course, in this short writing we could not carry out a thorough analysis of the functioning institutional system. Yet, we make two statements:

> Thesis 1. Formal establishment of market economy institutions – from competition rules through income taxation to strict consumer protection rules – does not imply their efficient operation. Only efficient and truly well-functioning market institutions make possible and promote innovation activities.
> Thesis 2. With regard to the complex institutional system, Hungary has not yet relinquished the institutional system that is characterized by a lack of actual competition for resources (cf. North et al., 2006).

New technologies and innovations – as many institutional economists and economic historians have convincingly demonstrated (e.g. North 1981, North 1990, Acemoglu et al. 2002, Grief 2006, Rodrik et al. 2004) – are not accidentally emerging and spreading in a society. They are rather consequences of the complexity of social relationships. It is important to emphasize that innovation is a social construction, and innovation occurs where it is allowed by the social atmosphere. According to Kornai (2010), five prerequisites are needed to make innovations and scientific achievements:

1.) A decentralized initiative, individual autonomy and freedom;
2) A huge reward for innovators, including fame and moral recognition;
3) Competition;
4) Free experimentation and acceptance of the associated failures;
5) Available funds to be invested (pp. 40-41).

All those social systems that lack these mutually interconnected elements are not suitable for further development. A number of analyses have pointed out the links between innovation and the social environment (Hollanders and Arundel, 2007, Havas, 2009, Bartha (ed.), 2007). Our approach is perhaps somewhat special in that, following Kornai and North, we do not emphasize the role of any specific factors, but rather their interactions.

> "Economists have carefully documented that there is no single factor explaining economic development – capital accumulation, human capital, resources, international trade or geographic location – to name but a few outstanding examples. Instead, it seems that the complex way in which societies structure human relationships – economic, political, religious

and other interaction-forming institutions – are the key to understanding why certain societies are capable of sustainable economic and political development" (North et al. 2006).

For example, the degree of capital accumulation or the human resources of the country alone do not explain either rapid growth or progress with a protracted crisis in any country. In the case of Hungary, almost complete system of formal market economy institutions are only vestigial realistic market economy institutions, many institutions exist only as a blank framework, which is only partially filled with real content (Sajó, 2008, Fleck 2008, Krekó – P. Kiss, 2007, Szántó-Tóth, 2008, Tátrai, 2006, Belyó, 2008). The notion of the institution is not simply a published or legal form of operating rules. According to Schotter's classic definition[12], we refer to the declared operational rules as an institution that emphasize the observable, realistic regularities of operation and not just the officially-declared rules that many rarely adhere to. Many of the "streamlined" market economy institutions introduced in Hungary during the change of regime and EU accession do not work efficiently: a significant part of these real interactions is at the crossing, partial or complete circumvention of the framework. Formal and real institutional systems have not come close to each other over the past few decades or even decades, and what is more, in some respects, they have moved away from each other.

And the point is precisely this: Behind the formal rules of behavior similar to advanced market economies, radically different behavioral patterns and regularities can be observed. If we look more closely at the reasons behind the lack of rapprochement to advanced, innovative economies, we find the following real facts and behaviors that are obviously irrelevant (see Table 1).

Table 1. Factors explaining the weak innovation of the Hungarian economy

Objective explanatory factors	**Behavioral factors**
Strong path dependence, the survival of certain features and elements of the planned economy's institutional structure (favoritism / protectionism) in distribution processes, consumer's exposure, excessive, oppressive bureaucracy, (hypertrophy of bureaucracy)	Low willingness for taking risk
Low level of social mobility. Rigidity of social structures	Low level of docility and flexibility
Corporate competitiveness is still largely determined by the relationship with the state, and less is built on productivity and innovation	Much of the companies and the population could not get away from the state
A significant part of the actual budget constraint on market players is soft.[12]	Not responsible for agreements, contracts, non-compliant rules, low pay morals
Over the past three decades, the success of the government has been loosely dependent on the successful operation of the economy.	Low tolerance level, lack of openness in the use of foreign experiences.

Source: Own editing

12 Schotter based his own definition on David Lewis' notion, which essentially was formulated for the institutions that Lewis created for conventions (see Lewis, 1969, p. 44).

13 See Dewatripont – Roland (2000).

There is no need for a specific explanation for the restrictive factors in Table 1, in most cases the link between these factors and the weakness of innovation is clear. The linkage between the different objective and subjective factors is income without performance or innovation. However, among the subjective factors, the relationship between social mobility and innovation, openness, tolerance and innovation is not so trivial, so in some sentences it is worth illuminating these relationships.

In Brenner's book (1994), he illustrates with many examples that innovations appear when people are confronted with diversity. He says that in the course of history, always the countries or regions were the "flagship" of innovation (from medieval Venice to the Netherlands to California), because of their geographic location (island or coast) natural and frequent encounters with strangers. Strangers taught locals that they were "possible in other ways" and encouraged them to depart from their routine. For this, however, there was a need for tolerance and openness towards other routines, habits, ideas. (The relationship is, of course, two-way, frequent encounter with diversity helps to develop tolerance.) In contrast, in the big continental realms (for example, in Russia), we often see examples of stagnation. Isolation makes societies balder, single-faced and rigid; encountering strangers protects them from rigidity.

While Hungary is economically one of the most open EU countries, the export activity intensity is even higher than the German economy, paradoxically, this openness does not appear in the thinking of the population. All sociological surveys show that Hungary – compared to international data – is a closed country (as far as the population's thinking is concerned), and tolerance towards foreigners is rather low (Decso-Sík, 2007). According to research carried out by TÁRKI since 1992, after the initial rapid growth of 1992-1995, the rate of xenophobia fluctuated, and since 2002, with minor fluctuations, it remains fairly stable until 2011. Compared with previous years, the proportion of hostility towards foreigners grew in 2012, and remained high in 2013 and 2014 compared to the average of the 2000s. Data from April 2015 exceeded the highest level in 2001, and the share of xenophobic respondents rose from 43% to 46% (Sík 2016).

In addition, many of the country's indicators (the proportion of foreign-language students in Hungary, the extremely low level of foreign languages compared to the majority of EU Member States) is a rather closed and less tolerant country, which does not really support innovation. Openness and tolerance are necessary not only for relations with aliens, but also for accepting and tolerating innovators and innovations. If "hard, creative people" are treated with distrust and hostility, it does not imply the "soaring" of innovations.

The lack of social mobility limits the innovation by the same logic as isolation from, and intolerance against, strangers. "Upward" people do not expect "opportunities to come to them," but are looking for them, trying to gain experience from elsewhere or from abroad, or strive to integrate into a community that is completely different from their own, from their original community (say, if they move from one part of the country to another).

Privatization that is the basis of a market economy alone does not make economic actors innovative. If producers and service providers need to innovate to gain profits, they will innovate if they have to invest, they will invest, but if they do have the benefit of merely using their own relational capital or some "well-established" monopoly, they won't feel aby motivation for innovation. If they can increase the profits of their company without

increasing the consumer surplus or without answering the market needs or even anticipating them, they will not innovate. We also know from the planned economy that the soft budget constraint or the dependence on state aid is not conducive to innovation. As many campaigns initiate to increase R&D, no matter how spectacular innovation or information strategies are being developed, any EU support is used, the innovation capacity of the economy can only be increased if the constraining factors are reduced: the budget constraint becomes harder, the role of relational capital and dependence on the state is weakened, and the willingness to take risks and mobility increases.

The limiting factors of innovation are not independent from each other, rather they form a system. Economic actors should deliver outstanding performance in building relationships to state institutions and expanding their relational capital, not in competition or innovation. If they succeed in doing so, they can get higher rents without taking any particular risk. Innovation is a high risk, and it is much more attractive to risk-averse economic actors to have a low-risk relationship with the state. Such a fruitful relationship softens the budget constraints of "friendly" companies, and thus their budget constraints are more similar to the planned economy than the hard budget constraints of a market economy. The behavior of economic actors is adapted to this situation. Flexibility and learning ability are not so much needed, on the contrary: for the beneficiary companies, maintaining the status quo is the main objective. This in itself limits the efficient functioning of the economy and innovation. State-favored groups in the interest of maintaining the status quo will do their utmost to keep everyone away from "well-founded" economic positions. To this end, they significantly restrict competition and restrict the opportunities of emerging players. It is no coincidence that tens or hundreds of thousands of enterprising Hungarians have left the country and have moved to more open economies offering better conditions for competition, especially in developed EU countries.

Some conclusions

Behind these highly intertwined factors is a social structure that restricts access to resources and opportunities within narrow boundaries, where opportunities are far from equal, and thus necessarily involve limited activities and findings in innovation.

1. In the 21st century's global competition, innovation is the key to success. Hungary's overwhelmingly reprehensible difficulties, which are repetitive in their nature, are closely linked to the limited global competitiveness of the country, which is mainly due to the low innovative ability.

2. The innovative nature of the economy is not exogenously evolving, but it can be explained by the institutional structure of the country, in other words the complexity of economic relations.

3. The implementation of the formal institutions of the market economy does not mean that these institutions also become the observable rules of real economic behavior, and their implementation alone does not guarantee their effective functioning. The same formal institutions (such as a contract) operate in a completely different way in an open society than in a place where actors have limited access to resources.

4. Real conditions and behavioral patterns and attitudes behind the formal institutional structure do not really support innovation in Hungary.

5. In improving economic innovation, in strengthening economic competitiveness, and to overcome the frequent economic difficulties that have been reproduced since the beginning of economic transformation, we can only expect sizeable progress to be achieved if these constraints are mitigated, dependence on the state is reduced, soft budget constraints harden, while tolerance and social mobility grow.

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